

WHAT IS CLAIMED IS:

1. An electrode for a dielectrophoretic apparatus characterized in that a vacant space is formed in the electrode in such a way as concentrating substances subjected to influence by a negative dielectrophoretic force in said vacant space of the electrode or above or below position of the space.

2. The electrode according to claim 1 wherein said vacant space is a hollow space.

3. The electrode according to claim 1 wherein all the circumference of said vacant space is surrounded by the electrode.

4. The electrode according to claim 1 wherein an area in which substances subjected to influence by a negative dielectrophoretic force are concentrated is an area in which density of an electric flux line is low.

5. The electrode according to claim 1 wherein said electrode is formed in such a way as concentrating substances subjected to influence by a negative dielectrophoretic force in said electrode when a liquid containing said substances subjected to influence by a negative dielectrophoretic force is positioned at said electrode or above the vacant space or in the vicinity thereof, or is caused to flow above or below thereof.

6. The electrode according to claim 1 wherein said electrode is in the form of circular, oval or polygonal, and a

circular, oval or polygonal vacant space is formed in the central part thereof.

7. The electrode according to claim 1 wherein said electrode is provided on a substrate.

8. The electrode according to claim 7 wherein said substrate provided with said electrode is made of a material which does not substantially reflect excitation light or permeates light to such an extent as capable of measuring absorbance.

9. The electrode according to claim 8 wherein said substrate provided with said electrode is made of a transparent material.

10. The electrode according to claim 1 wherein the substances subjected to influence by the negative dielectrophoretic force generated by application of voltage to said electrode are granular substances.

11. An electrode construction for an dielectrophoretic apparatus comprising an electrode and a lid provided thereabove so as to form a gap between the lid and said electrode surface, wherein a vacant space is formed in the electrode in such a way as concentrating substances subjected to influence by a negative dielectrophoretic force generated by application of voltage to said electrode in a vacant space of said electrode or above or below position of the space.

12. A method for manufacturing an electrode according to

claim 1 characterized in that said vacant space is formed by physical or chemical means.

13. The method for manufacturing an electrode according to claim 1 wherein said electrode and said vacant space are prepared by the fine processing technique.

*Sub A* 14. A dielectrophoretic apparatus comprising the electrode for a dielectrophoretic apparatus of claim 1 or the electrode construction for a dielectrophoretic apparatus of claim 11.

15. A separation method of substances characterized in that a liquid containing substances subjected to influence by a negative dielectrophoretic force generated by application of voltage to said electrode is positioned at an electrode having a vacant space therein or above the vacant space or in the vicinity thereof, or is caused to flow above or below thereof, so as to concentrate said substances subjected to influence by a negative dielectrophoretic force in said vacant space or above or below position of the space.

16. The separation method according to claim 15 wherein said electrode composes an electrode construction with a substrate on which said electrode is provided and a lid in such a way as making a gap between said electrode and said lid, and a liquid containing substances subjected to influence by said negative dielectrophoretic force is charged through said gap to allow the substances to contact with or to communicate to the

electrode.

17. The separation method according to claim 16 wherein said substance subjected to influence by said negative dielectrophoretic force is a complex of "a substance binding to a substance to be measured", "a substance subjected to influence by a negative dielectrophoretic force", and the substance to be measured which binds to said "substance binding to a substance to be measured".

18. The separation method according to claim 17 wherein said "substance subjected to influence by a negative dielectrophoretic force" is "a granular substance subjected to influence by a negative dielectrophoretic force".

19. A detection method of substances characterized in that a liquid containing said substances subjected to influence by a negative dielectrophoretic force generated by application of voltage to said electrode is positioned at an electrode having a vacant space therein or above the vacant space or in the vicinity thereof, or is caused to flow above or below thereof, so as to concentrate said substances subjected to influence by a negative dielectrophoretic force in said vacant space or above or below position of the space, and then said substance is optically detected.

20. The detection method according to claim 19 wherein said substances subjected to influence by said negative dielectrophoretic force is a complex of "a substance binding to

a substance to be measured", "a substance subjected to influence by a negative dielectrophoretic force" and the substance to be measured which binds to said "substance binding to a substance to be measured" .

21. The detection method according to claim 20 wherein said "substance subjected to influence by a negative dielectrophoretic force" is "a granular substance subjected to influence by a negative dielectrophoretic force".

22. A dielectrophoretic apparatus characterized in that in a dielectrophoretic apparatus provided with an electrode on a substrate, a construction for realizing an increase of non-uniform electric field region is formed among electrodes.

23. A dielectrophoretic apparatus characterized in that in a dielectrophoretic apparatus provided with an electrode on a substrate, the places among said electrodes are made in lower level than the electrode level.

24. The dielectrophoretic apparatus according to claim 23 wherein said electrode is held by a convex construction on said substrate to make the places among said electrodes in lower level than said electrode level.

25. A method for manufacturing a dielectrophoretic apparatus characterized in that a substrate is excavated by physical or chemical means to make the places among said electrodes in lower level than said electrode level.

26. The method for manufacturing a dielectrophoretic

apparatus according to claim 25 wherein said chemical means is an etching using an etching liquid for the substrate of said dielectrophoretic apparatus.

27. In a separation method in which a liquid containing substances to be separated is present within non-uniform electric field generated by a dielectrophoretic electrode, and separation is carried out by utilizing difference in the dielectrophoretic forces exerting on said substances, the improvement is that an increase of non-uniform electric field is realized by making the places among the electrodes in lower level than the electrode level, so as to enhance the collecting ability of substances.

28. In a separation method in which a liquid containing substances to be separated is caused to flow into non-uniform electric field generated by the dielectrophoretic electrode, and separation is carried out by an interaction of the dielectrophoretic force exerting on said substance and fluid drag, the improvement is that the increase of non-uniform electric field region and the reduction in fluid drag are realized by making the places among the electrodes in lower level than the electrode level, so as to enhance the collecting ability of substances.

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